



## Mini-Max M245 Series Digital Panel Meter

- Minimum Depth Indicator - Less than 2.5" (60mm) of Space Required Behind the Panel
- Stackable Mounting Bracket for Easy Installation
- LCD: 4-1/2 Digit, 0.5" (12.7mm) High LCD Display with Optional Negative Image, Bright Red Backlighting
- LED: 4-1/2 Digit, 0.4" (10.2mm) High Display
- Limited Range Display Scaling and Adjustable Offset
- Standard Screw Terminals for Easy Installation
- Four Ranges: 4-20mA, 1-5VDC, 0-10 VDC, 0-100VDC
- 85-250VAC or optional 9-32VDC Power Supply
- Scaled 0-100%



LCD



LED

Simpson's Mini-Max Process Indicators provide high quality accuracy and reliability in a compact, 60mm deep case.

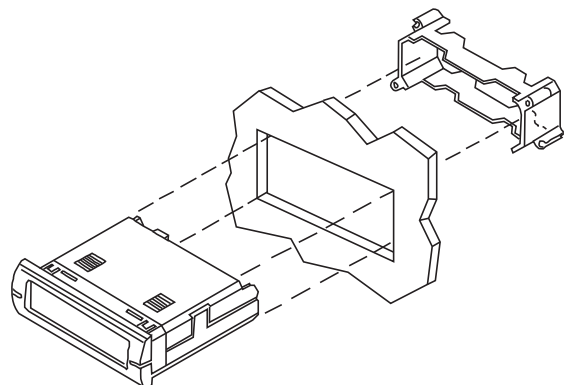
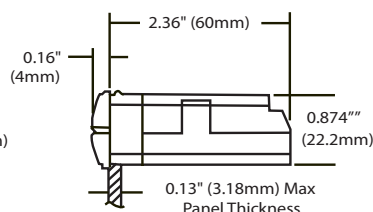
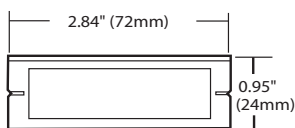
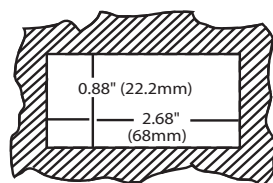
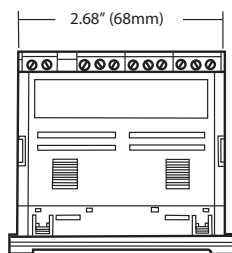
LCD (Liquid Crystal Display) Units offer a 4-1/2 digit, 0.5" (12.7mm) LCD display with an optional bright red, negative image, backlight.

LED (Light Emitting Diode) Units offer a 4-1/2 digit, 0.4" (10.2mm) display.

All units feature user-selectable decimal point, auto zero and limited scaling capabilities.

A unique mounting bracket is provided to allow for vertical or horizontal stacking of multiple indicators. All Mini-Max units feature a 3/64 DIN, high-impact plastic case. The LCD units have a clear viewing window, and the LED units have a red viewing window.

## Installation and Panel Cutout



## Mounting Requirements

Insert the Mini-Max through the panel, and then slide the mounting bracket onto the Mini-Max. The mounting bracket allows Mini-Max units to be stacked side-to-side or top-to-bottom and maintain the DIN standard panel arrangements in 24mm by 72mm multiples. Panel cutout instructions for stacking multiple units are provided under "stacking features."

## Specifications

### DISPLAY

**Type:** 7-segment LCD or LED

**Height:** LCD 0.5" (12.7mm)

LED 0.4" (10.2mm)

**Decimal point:** 4-position selectable

### Over-range Indication:

LCD Most significant digit = "1"

LED Blinking display

**LCD Backlighting:** Optional negative image, red backlight

**Polarity:** Auto with "-" indication, "+" implied

### POWER REQUIREMENTS

**AC Volt:** 85-250VAC @40-440Hz

**DC Volt:** 9-32VDC

**Power Consumption: (Non Fused)**

85-250VAC: LCD 4.0VA (2.4W) max

LED 3.6VA (2.16W) max

9-32VDC: LCD 3W max

LED 2W max

**Isolation:** 250 Vrms Max

### NOISE REJECTION

**CMRR:** 86dB typical

**ACCURACY @ 25°C**

±(0.1% of reading ±1 count)

### ENVIRONMENTAL

**Operating Temperature:** 0 to 55°C

**Storage Temperature:** -10 to 60°C

**Relative Humidity:** 0 to 85% non condensing @ 40°C

### Excitation Option:

12Vdc ± 10%, 24Vdc ± 10%

25mA dc

### Temperature Coefficient:

(0.2% of reading ±0.5 digit)/°C

Warmup time: Less than 20 minutes

### ANALOG TO DIGITAL CONVERSION

**Technique:** Integrating dual slope

**Rate:** 3 samples/second-typical

### MECHANICAL

**Bezel:** 0.95" x 2.84" (24mm x 72mm)

**Depth:** 2.36" (60mm)

**Panel cutout:** 0.88" x 2.68" (22.2mm x 68mm)

**Weight:** LCD 3.5oz (99.2g)

LED 2.6oz (74g)

### Case Material:

94-0, UL-rated, glass-filled thermoplastic

**INPUTS:** DC Process

## PROCESS

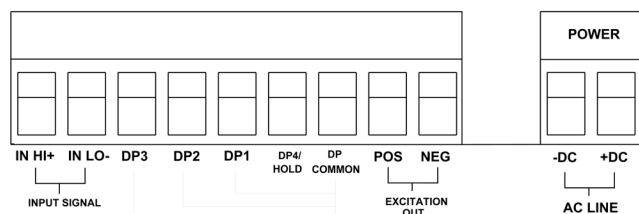
Range	Resolution	Voltage Drop	Max Input
	M245		
4 to 20mA	0.01%	200mVdc	60mA
		Input Impedance	
1 to 5Vdc	0.01%	10MEG	250Vdc
0 to 10Vdc	0.01%	10MEG	250Vdc
0 to 100Vdc	0.01%	10MEG	250Vdc



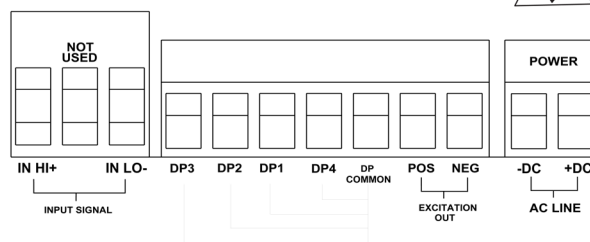
DP4 DP3 DP2 DP1

## Connections

### LCD VERSIONS



### LED VERSIONS



**WARNING:** These instruments are designed for maximum safety to the operator when mounted in a panel according to instructions. They are not to be used unmounted or for exploratory measurements in unknown circuits.

**Input Signal:** Connect the DC signal to be monitored to the **IN HI+** and **IN LO-** input terminals.

**Input Power:** For AC power, connect the AC POWER LINE to the **AC LINE** inputs. For optional DC power, connect the DC Supply to the DC inputs. Observe polarity.

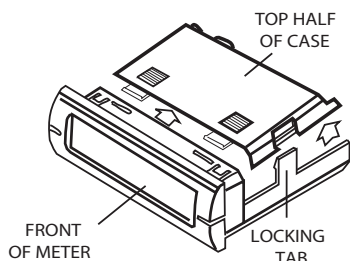
**Decimal Point:** To select a decimal point, connect the appropriate DP input pin (DP1 - DP4) to the DP COMMON output. Unused DP inputs may remain unconnected (open).

**LCD Hold Option:** Connect the DP COMMON output to the **HOLD** input. If this feature is not required, the HOLD pin may remain unconnected. Hold is optional on LCD versions only, replaces DP4 and is available from our modification center.

**LCD Backlight Option:** Negative image, bright red backlighting is available for the LCD versions only. This illumination allows the unit to be read in low light areas. Backlighting power is supplied by the Mini-Max, so no additional external power is required.

**Excitation Option:** Excitation is available at the **EXCITATION OUT** Positive (**POS**) and Negative (**NEG**) terminals for powering external transmitters or transducers. This source is isolated from the measurement input as well as the input power circuits. The voltages available are 12Vdc or 24Vdc with a maximum load current of 25mA. This feature eliminates the need to mount an external DC power source for transducers or sensors used in your application.

## Display Scaling



Using a screwdriver or thumbnail, spread the tabs on each side of the case to unlock the top half. Lift the rear of the top half and slide it away from the front of the meter.

### Scale Adjustment:

Mini-Max indicators have limited range coarse and fine adjustments for display scaling. There are no optional connections required for these to function. The meter can be scaled down to 1/2 the value of the input, or scaled up to 1 times the value of the input, or a maximum reading of 1.9999, whichever is lower.

### LCD VERSIONS

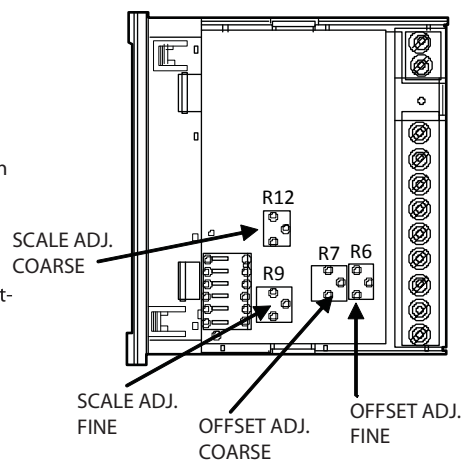
#### Scale Adjustment:

The "Coarse" adjustment R12 will allow a limited range of scaling values. The "Fine" adjustment R9 allows for an adjustment range of approximately 1% of the "Coarse" adjustment. Apply the full scale input to the meter. Adjust R12 to be within 1% of the desired result. Then use R9 to obtain the final desired result.

#### Offset Adjustment:

The "Coarse" adjustment R7 will allow approximately 2500 counts of Offset adjustment. The "Fine" adjustment R6 allows for an adjustment range of approximately 1% of the "Coarse" adjustment.

Apply the offset input signal (e.g. 4mA on the 4-20 mA scale). Adjust R7 to within 1% of the desired offset value, then use R6 to obtain the final desired result.



Note: Any physical damage to the meter during adjustment will void the warranty.

### LED VERSIONS

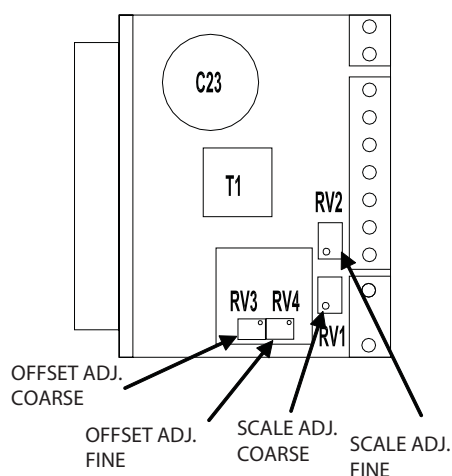
#### Scale Adjustment:

The "Coarse" adjustment RV1 will allow a limited range of adjustment values. The "Fine" adjustment RV2 allows for an adjustment range of approximately 1% of the "Coarse" adjustment.

Apply the full scale input to the meter. Adjust RV1 to be within 1% of the desired result. Then use RV2 to obtain the final desired result.

#### Offset Adjustment:

The "Coarse" adjustment RV3 will allow approximately 2500 counts of Offset adjustment. The "Fine" adjustment RV4 allows for an adjustment range of approximately 1% of the "Coarse" adjustment. Apply the offset input signal (e.g. 4mA on the 4-20mA scale). Adjust RV3 to within 1% of the desired offset value. Then use RV4 to obtain the final desired result.



Note: Any physical damage to the meter during adjustment will void the warranty.

## Stacking Features

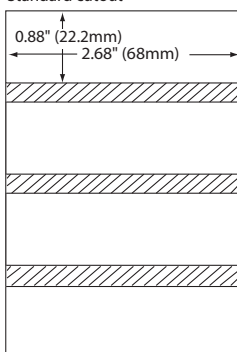
The mounting brackets, included with every Mini-Max, can be connected together. Multiple units can be mounted in a single opening, allowing perfect alignment.

To punch one hole for multiple units, be sure to adjust the standard panel cutout dimensions as shown here; otherwise the meters will not fit properly in the hole.

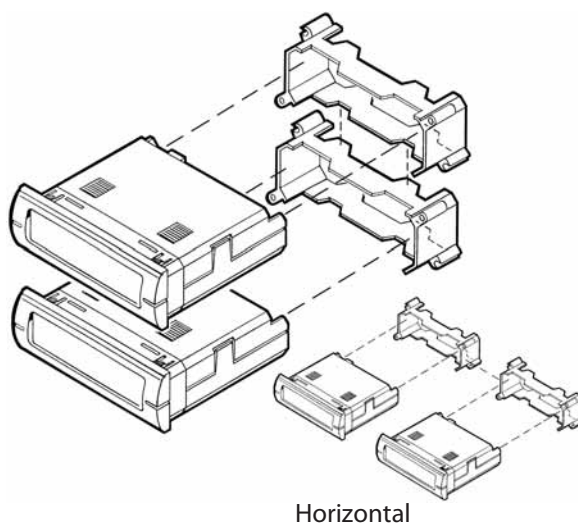
Mounting multiple units is quick and easy. Install the first meter (bottom unit first if stacking vertically). Position the next mounting bracket snugly against the first one, and slide the second meter into place. Repeat for remaining units.

### Vertical

Standard cutout

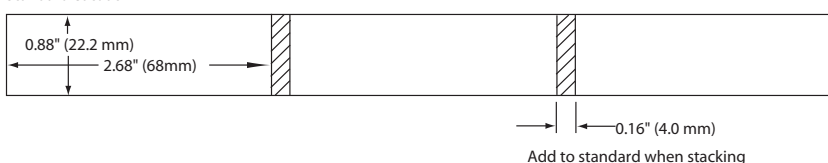


Vertical



### Horizontal

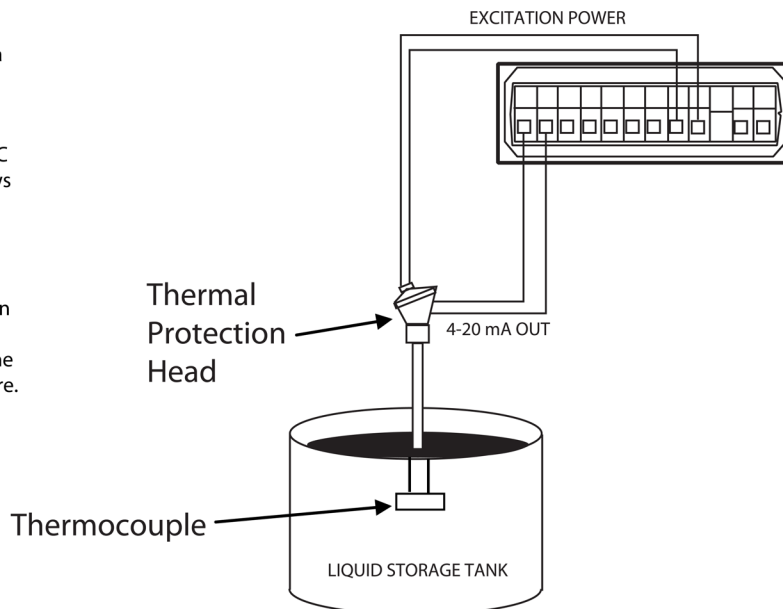
Standard cutout



## Application Example

Remote temperature (0-800°) monitoring of a liquid storage tank is required.

Circuitry within the Thermal Protection Head converts the thermocouples mV output to a DC current ranging from 4mA to 20mA. This allows the Mini-Max to be in a remote location, such as a control room. The Mini-Max must be scaled prior to connecting the 4-20mA signal. Scaling causes a 4mA output to read zero on the display and a 20mA output to read 800.0 on the display. After scaling, the 4-20mA signal is connected to the IN HI and IN LO terminals. The Mini-Max will then display the tank temperature.



## Ordering Information

The Mini-Max Process Indicator can be configured by making an entry for each box.

Basic Unit	Display	DPM Power Supply	Range	Excitation Output**
M245 4-1/2 Digit Indicator	0 Non Backlight (LCD) 1 Negative Image Red (LCD) 2 Red LED	0 85-250 VAC 2 9-32VDC	71 4-20mA 72 1-5VDC 73 0-10VDC 74 0-100VDC	0 None 1 12VDC 2 24VDC

\*\*25mA max

**NOTE:** LCD display hold feature is configured at the factory only and must be specified at time of order.

**NOTE:** Special scaling is available from the factory at the time of ordering.

## Safety Symbols



The **WARNING** sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury.



The **CAUTION** sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly adhered to, could result in damage to or destruction of part or all of the instrument.